

AMENDMENTS TO THE CLAIMS

1 1. (Currently Amended) A method of ~~consolidating~~ using a computer system
2 to consolidate multiple configuration models ~~using an automated process~~, the method
3 comprising:

4 ~~identifying~~ determining if a conflict exists between at least two of the
5 configuration models, wherein the configuration models are organized in
6 accordance with respective directed acyclic graphs, each configuration
7 model includes at least one ancestor configuration model family space and
8 a child configuration model family space below the ancestor configuration
9 model family space, a first of the conflicting configuration model models
10 comprises an ancestor configuration model family space that is different
11 than an ancestor configuration model family space of a second of the
12 conflicting configuration model, and each child configuration model
13 family space constrains the ancestor configuration model family space
14 above the child in accordance with configuration rules of the configuration
15 model to which the child belongs a configuration model that includes a
16 release of a product that is not released in at least a second conflicting
17 configuration model and the product is defined using the ancestor and
18 child configuration model families;

19 extending at least one of the ancestor configuration model family spaces of the
20 conflicting configuration models so that the ancestor configuration model
21 family spaces of the first and second conflicting configuration models
22 represent the same ancestor configuration model family space product in
23 the first conflicting configuration model to be compatible with second
24 conflicting configuration model;

25 removing from the child configuration model family space any configuration
26 space extended in the ancestor of the child configuration family space
27 restricting child family in the first conflicting configuration model so that
28 the child family is not released in the extension of the ancestor family; and

29 combining the first and second configuration models into a single, consolidated
30 model that maintains a non-cyclic chain of dependencies among families
31 and features of families for use in answering configuration questions.

1 2. (Original) The method of claim 1 further comprising:
2 detecting any inconsistencies between rules included in the consolidated model;
3 and
4 attempting to resolve any detected inconsistencies.

1 3. (Currently Amended) A computer system for consolidating multiple
2 models, the system comprising:
3 a processor; and
4 a memory, coupled to the processor, having code stored therein and executable by
5 the processor for:
6 identifying ~~determining if~~ a conflict ~~exists~~ between at least two of the
7 configuration models, wherein the configuration models are
8 organized in accordance with respective directed acyclic graphs,
9 each configuration model includes at least one ancestor
10 configuration model family space and a child configuration model
11 family space below the ancestor configuration model family space,
12 a first of the conflicting configuration ~~model~~ models comprises an
13 ancestor configuration model family space that is different than an
14 ancestor configuration model family space of a second of the
15 conflicting configuration model, and each child configuration
16 model family space constrains the ancestor configuration model
17 family space above the child in accordance with configuration
18 rules of the configuration model to which the child belongs a
19 configuration model that includes a release of a product that is not
20 released in at least a second conflicting configuration model and
21 the product is defined using the ancestor and child configuration
22 model families;

extending at least one of the ancestor configuration model family spaces
of the conflicting configuration models so that the ancestor
configuration model family spaces of the first and second
conflicting configuration models represent the same ancestor
configuration model family space ~~product~~ in the first conflicting
configuration model to be compatible with second conflicting
configuration model;
removing from the child configuration model family space any
configuration space extended in the ancestor of the child
configuration family space restricting child family in the first
conflicting configuration model so that the child family is not
released in the extension of the ancestor family; and
combining the first and second configuration models into a single,
consolidated model that maintains a non-cyclic chain of
dependencies among families and features of families for use in
answering configuration questions.

4. (Currently Amended) A computer ~~program product~~ readable medium
having instructions encoded therein and executable by a processor to consolidate multiple
models, the instructions comprising code for:
identifying ~~determining if~~ a conflict exists between at least two of the
configuration models, wherein the configuration models are organized in
accordance with respective directed acyclic graphs, each configuration
model includes at least one ancestor configuration model family space and
a child configuration model family space below the ancestor configuration
model family space, a first of the conflicting configuration model models
comprises an ancestor configuration model family space that is different
than an ancestor configuration model family space of a second of the
conflicting configuration model, and each child configuration model
family space constrains the ancestor configuration model family space
above the child in accordance with configuration rules of the configuration

15 ~~model to which the child belongs a configuration model that includes a~~
16 ~~release of a product that is not released in at least a second conflicting~~
17 ~~configuration model and the product is defined using the ancestor and~~
18 ~~child configuration model families;~~
19 extending at least one of the ancestor configuration model family spaces of the
20 conflicting configuration models so that the ancestor configuration model
21 family spaces of the first and second conflicting configuration models
22 represent the same ancestor configuration model family space product in
23 the first conflicting configuration model to be compatible with second
24 conflicting configuration model;
25 removing from the child configuration model family space any configuration
26 space extended in the ancestor of the child configuration family space
27 restricting child family in the first conflicting configuration model so that
28 the child family is not released in the extension of the ancestor family; and
29 combining the first and second configuration models into a single, consolidated
30 model that maintains a non-cyclic chain of dependencies among families
31 and features of families for use in answering configuration questions.

1 5. (Previously Presented) The method of claim 1 wherein the
2 configuration models represent configuration models of vehicles.

1 6. (Previously Presented) The method of claim 1 wherein the
2 consolidated model includes only buildable configurations.

1 7. (Currently Amended) The method of claim 1 wherein:
2 extending at least one of the ancestor configuration model family spaces of the
3 conflicting configuration models so that the ancestor configuration model
4 family spaces of the first and second conflicting configuration models
5 represent the same ancestor configuration model family space product in
6 the first conflicting configuration model to be compatible with second
7 conflicting configuration model further comprises:

8 extending a rule from the first ~~conflicting~~ configuration model into the
9 ancestor configuration model family space; and
10 removing from the child configuration model family space any configuration
11 space extended in the ancestor of the child configuration family space
12 restricting child family in the first conflicting configuration model so that
13 the child family is not released in the extension of the ancestor family
14 further comprises:
15 repairing the extension of the rule in the child family.

1 8. (Currently Amended) The method of claim 1 wherein combining the first
2 and second models into a single, consolidated model further comprises:
3 loading the configuration models into a memory of the computer system;
4 constructing a directed acyclic graph of all rules in all the configuration models;
5 for each configuration model, determining which portions of an overall
6 configuration space for which the configuration model does not provide a
7 buildable configuration; and
8 for each configuration model, constraining statements of the rules within the
9 configuration model to fall within a space of defining features of the
10 configuration model.

1 9. (Previously Presented) The method of claim 8 wherein determining which
2 portions of an overall configuration space for which each configuration model does not
3 provide a buildable configuration further comprises:
4 determining which families are ancestors of families of defining constraints; and
5 subtracting a right hand side and a left hand side of each rule of each family that
6 are ancestors of families of defining constraints from a rule representing
7 all buildable configurations.

1 10. (Previously Presented) The system of claim 3 further comprising code
2 for:
3 detecting any inconsistencies between rules included in the consolidated model;
4 and

5 attempting to resolve any detected inconsistencies.

1 11. (Previously Presented) The system of claim 3 wherein the
2 configuration models represent configuration models of vehicles.

1 12. (Previously Presented) The system of claim 3 wherein the
2 consolidated model includes only buildable configurations.

1 13. (Currently Amended) The system of claim 3 ~~further comprising code for~~
2 wherein:
3 the code for extending at least one of the ancestor configuration model family
4 spaces of the conflicting configuration models so that the ancestor
5 configuration model family spaces of the first and second conflicting
6 configuration models represent the same ancestor configuration model
7 family space comprises code for extending a rule from the first conflicting
8 configuration model into the ancestor of a family; and
9 the code for removing from the child configuration model family space any
10 configuration space extended in the ancestor of the child configuration
11 family space comprises code for repairing the extension of the rule in the
12 child family.

1 14. (Currently Amended) The system of claim 3 ~~further comprising the code~~
2 for combining the first and second models into a single, consolidated model further
3 comprises code for:
4 loading the configuration models into a memory of the computer system;
5 constructing a directed acyclic graph of all rules in all the configuration models;
6 for each configuration model, determining which portions of an overall
7 configuration space for which the configuration model does not provide a
8 buildable configuration; and
9 for each configuration model, constraining statements of the rules within the
10 configuration model to fall within a space of defining features of the
11 configuration model.

1 15. (Currently Amended) The system of claim 14 ~~further comprising wherein~~
2 the code for determining which portions of an overall configuration space for which the
3 configuration model does not provide a buildable configuration further comprises code
4 for:

5 determining which families are ancestors of families of defining constraints; and
6 subtracting a right hand side and a left hand side of each rule of each family that
7 are ancestors of families of defining constraints from a rule representing
8 all buildable configurations.

1 16. (Currently Amended) The computer ~~program-product~~ readable medium of
2 claim 4 further comprising code for:

3 detecting any inconsistencies between rules included in the consolidated model;
4 and
5 attempting to resolve any detected inconsistencies.

1 17. (Currently Amended) The computer ~~program-product~~ readable medium of
2 claim 4 wherein the models represent configuration models of vehicles.

1 18. (Currently Amended) The computer ~~program-product~~ readable medium of
2 claim 4 wherein the configuration models represent configuration models of vehicles.

1 19. (Currently amended) The computer ~~program-product~~ readable medium of
2 claim 4 ~~further comprising code for wherein:~~

3 the code for extending at least one of the ancestor configuration model family
4 spaces of the conflicting configuration models so that the ancestor
5 configuration model family spaces of the first and second conflicting
6 configuration models represent the same ancestor configuration model
7 family space comprises code for extending a rule from the first conflicting
8 configuration model into the ancestor of a family; and
9 the code for removing from the child configuration model family space any
10 configuration space extended in the ancestor of the child configuration

11 family space comprises code for repairing the extension of the rule in the
12 child family.

1 20. (Currently Amended) The computer ~~program-product~~ readable medium of
2 claim 4 ~~further comprising the~~ code for combining the first and second models into a
3 single, consolidated model further comprises code for:
4 loading the configuration models into a memory of the computer system;
5 constructing a directed acyclic graph of all rules in all the configuration models;
6 for each configuration model, determining which portions of an overall
7 configuration space for which the configuration model does not provide a
8 buildable configuration; and
9 for each configuration model, constraining statements of the rules within the
10 configuration model to fall within a space of defining features of the
11 configuration model.

1 21. (Currently Amended) The computer ~~program-product~~ readable medium of
2 claim 20 ~~further comprising wherein the~~ code for determining which portions of an
3 overall configuration space for which the configuration model does not provide a
4 buildable configuration further comprises code for:
5 determining which families are ancestors of families of defining constraints; and
6 subtracting a right hand side and a left hand side of each rule of each family that
7 are ancestors of families of defining constraints from a rule representing
8 all buildable configurations.

1 22. (Currently Amended) A computer system for performing an automatic
2 consolidation of multiple models of configurable products, the system comprising:
3 means for identifying ~~determining~~ if a conflict exists between at least two of the
4 configuration models, wherein the configuration models are organized in
5 accordance with respective directed acyclic graphs, each configuration
6 model includes at least one ancestor configuration model family space and
7 a child configuration model family space below the ancestor configuration
8 model family space, a first of the conflicting configuration ~~model~~ models

comprises an ancestor configuration model family space that is different than an ancestor configuration model family space of a second of the conflicting configuration model, and each child configuration model family space constrains the ancestor configuration model family space above the child in accordance with configuration rules of the configuration model to which the child belongs ~~a configuration model that includes a release of a product that is not released in at least a second conflicting configuration model and the product is defined using the ancestor and child configuration model families;~~

means for extending at least one of the ancestor configuration model family spaces of the conflicting configuration models so that the ancestor configuration model family spaces of the first and second conflicting configuration models represent the same ancestor configuration model family space ~~product in the first conflicting configuration model to be compatible with second conflicting configuration model;~~

means for removing from the child configuration model family space any configuration space extended in the ancestor of the child configuration family space ~~restricting child family in the first conflicting configuration model so that the child family is not released in the extension of the ancestor family; and~~

means for combining the first and second configuration models into a single, consolidated model that maintains a non-cyclic chain of dependencies among families and features of families for use in providing an answer to configuration questions.